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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/595,235	03/28/2006	Ryoichi Omote	36856.1429	5315

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EXAMINER

SUMMONS, BARBARA

ART UNIT	PAPER NUMBER
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2817

NOTIFICATION DATE	DELIVERY MODE
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04/11/2008

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/595,235	Applicant(s) OMOTE, RYOICHI	
	Examiner BARBARA SUMMONS	Art Unit 2817	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 March 2006 (pre-amendment).
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 6-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 6-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 March 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>3/28/06</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 6-24 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Taniguchi U.S. 2003/0214368 in view of Nakagawara et al. JP 2002-353768 and Yoshida et al. U.S. 2001/0013739 (each cited by Applicant).

Regarding claims 6 and 15, Taniguchi discloses (see Fig. 1) a duplexer, comprising: a transmission-side band pass filter and a reception-side band pass filter 11 and 12 (see section [0044], lines 5-9), each including surface acoustic wave (SAW) resonators connected to define a ladder circuit. Regarding claims 8-10 and 18-20, each of the filters 11 and 12, and therefore the reception-side filter includes an inductance L1 or L2 in parallel with one of the series arm resonators, and each of the filters includes a bonding wire that inherently provides a second inductance (see Fig. 3 and see other art of record as evidence discussed below) connected between each of the parallel arm resonators and a ground potential pad T2, T4 and T6 of the package; wherein the first inductance L1 or L2 is defined by a line L1, L2 as shown in Fig. 3, embedded in the duplexer and the bond wires connected thereto, and the second inductance is a bond wire as discussed above. Regarding claims 11, 12 and 14 and 21, 22 and 24, each of

the filters has three series arm S1-S3 and S4-S6 resonators and two parallel arm P1, P2 and P3, P4 resonators, respectively; and the duplexer includes an antenna matching circuit with an inductance L3 between an antenna terminal T5 and an antenna 13, and a capacitor between a connection point between the inductance and the antenna and ground.

However, regarding claims 6, 7, and 15-17, Taniguchi discloses a 64 degree Y-cut, X-propagating lithium niobate substrate (see section [0056]) rather than an angle from 47 to 58 degrees as recited, and Taniguchi does not disclose a Ti foundation electrode layer below an Al electrode layer each being epitaxially grown and having the specifically recited faces aligned in parallel.

Nakagawara et al. discloses that it would have well known to have provided a Ti base electrode layer 5 (see the abstract and Fig. 1) and an Al electrode layer 4 on the Ti layer, wherein the (111) face of the Al layer, the (001) or (100) face of the Ti layer and the (001) face of the lithium niobate substrate 2 (see section [0021]) all being aligned in parallel (see the abstract, the last sentence thereof) and wherein the Ti and Al layers are each epitaxially grown (see e.g. sections [0015], [0021] and [0030]). This Ti/Al electrode provides the benefit of increased power withstanding performance (see the abstract, lines 1-3). Additionally, although Nakagawara discloses a 64 degree Y-cut, X-propagating lithium niobate substrate, it also is explicitly suggested that other cut angles may be used (see section [0047]).

Yoshida et al. discloses that a 55 degree Y-cut, X-propagating lithium niobate substrate would have been known in the SAW filter art (see e.g. the abstract) and

shows that one of ordinary skill in the art would have been known how to adjust the electrode thickness and duty ratio to achieve desired filter characteristics such as low propagation loss and the desired electromechanical coupling coefficient (see e.g. Figs. 5-10 and Figs. 15 and 16).

Consequently, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the SAW duplexer of Taniguchi (Fig. 1) by having provided it with electrodes including a base layer of epitaxially grown Ti with a layer of epitaxially grown Al thereon with the (111) face of the Al layer, the (001) or (100) face of the Ti layer and the (001) face of the lithium niobate substrate aligned in parallel, as suggested by the exemplary teaching thereof by Nakagawara, because such an obvious modification would have provided the advantageous benefit of increased power handling performance as explicitly suggested by Nakagawara (see the abstract, lines 1-3), and as would have been known by one of ordinary skill in the art.

It would have been equally obvious to one of ordinary skill in the art at the time the invention was made to have also substituted a 47-58 degree, and specifically a 55 degree Y-cut, X-propagating lithium niobate substrate in place of the standard 64 degree lithium niobate substrate of each of Taniguchi and Nakagawara, because such an obvious modification would have been the mere substitution of art recognized alternative piezoelectric substrates, and because Nakagawara explicitly suggests that the advantageous epitaxially grown electrodes would have been applicable to other cut angles of lithium niobate substrates (see section [0047]), and because, as suggested by the exemplary teaching of Yoshida, a 55 degree cut angle of lithium niobate would have

been advantageous due to low insertion loss and broader bandwidth of the SAW devices formed thereon as explicitly suggested by Yoshida (see e.g. section [0074] and Fig. 16), wherein one of ordinary skill in the art would have routinely made the cut angle choice according to these common individual filter requirements determined by electromechanical coupling coefficient and propagating characteristics of the substrate various cut angles, and wherein it would have been a simple matter to have adjusted the electrode thicknesses and duty ratios accordingly (see Yoshida Figs. 5-10).

Conclusion

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Taniguchi U.S. 6,819,203 provides evidence that the bond wires connected to the parallel arm resonators in a SAW ladder filter are inherently inductances (see the cover figures). Applicant also cited references JP 2000-261444 and JP 2003-008394 that provide evidence of this inherency.

Yuda et al. U.S. 6,445,261 provides evidence that it would have been well known to use layered Ti/Al electrodes (see col. 5, lines 45-48) to increase power handling capabilities in a SAW duplexer (see the abstract lines 1-4).

The article to Nakagawara et al. "High Power Durable SAW Antenna Duplexers for W-CDMA With Epitaxially Grown Aluminum Electrodes", covers the same or similar subject matter (see the abstract) as the Nakagawara et al. reference applied above, and clearly discloses the multilayered Ti/Al electrodes for use in duplexers (see the Title).

Tsutsumi et al. U.S. 7,030,716 also provides evidence that it would have been well known to increase power handling performance by the use of multilayered electrodes in SAW duplexer filters (see the Title and col. 12, lines 15-48).

Inoue et al. U.S. 6,630,767; Inoue U.S. 6,900,709; Nakagawara et al. U.S. 7,213,322 and U.S. 7,146,695 each provide discussions of multilayered epitaxially grown electrodes for SAW devices.

Nakano et al. U.S. 6,903,488 discloses multilayered epitaxially grown electrodes of SAW filters on 33 ± 9 degree lithium tantalate or lithium niobate substrates (abstract).

Kommrusch U.S. 5,933,062 provides evidence that it has been well known to use inductors in parallel with series arm resonators in SAW ladder filters (see Figs. 3-5 and col. 6, lines 32-48) to improve the filter insertion loss (col. 6, lines 41-48).

Yamamoto et al. U.S. 7,034,638 (cover figure) and Omote U.S. 2004/0119561 (Figs. 2, 22 and 23) each provide evidence that it would have been known to use both inductances in parallel with series arm resonators and in series between parallel arm resonators and ground to adjust or improve desired filter characteristics.

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to BARBARA SUMMONS whose telephone number is (571)272-1771. The examiner can normally be reached on M-Th, M-Fr.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bob Pascal can be reached on (571) 271-1769. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2817

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

bs
April 3, 2008

/Barbara Summons/
Primary Examiner, Art Unit 2817